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GUIDE TO A FORMAT FOR DATA ON CHEMICAL ADMIXTURES IN A MATERIALS PROPERTY DATABASE

Chiara F. Ferraris

Building and Fire Research Laboratory
National Institute of Standards and Technology
Gaithersburg, Maryland 20899

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National Institute of Standards and Technology

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Department of Commerce

Ronald H. Brown, *Secretary*

Technology Administration

Mary L. Good, *Under Secretary for Technology*

National Institute of Standards and Technology

Arati Prabhakar, *Director*

FOREWORD

The formats for data on chemical admixtures that are described in this report are intended to aid the creation of a coherent system of concrete materials property databases. This preliminary document is a guide that presents a recommended format for use in computerization of concrete materials property data. It addresses the problem of distinguishing one chemical admixture from another by providing a logical scheme for organizing and subdividing material characteristics and parameters to create a unique chemical admixture material identifier. The organization and structure presented in this guide provide a framework for cross-referencing chemical admixture properties, data, and other information which is consistent with the principles laid down in the standard guides that have been prepared by ASTM Committee E-49 and which are due to be adopted by American Concrete Institute (ACI) Committee 126. This preliminary working document is intended to assist the work of ACI committee 126 by providing a draft for use by committee members and others who may wish to offer suggestions for its development.

This preliminary document will be superseded by an official ACI document in the series on concrete materials property database formats that is being prepared by ACI 126.

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1. SCOPE

1.1 Introduction

With the advent of computers, databases comprised of data from research tests, as well as from the field, are becoming increasingly important. Unfortunately, in the absence of standard formats, databases on a given subject may differ in organization and in the exact types of data stored. In such cases, it is hard to share information between databases, particularly if the information stored does not uniquely identify a specific material. This problem can be avoided if all databases on the subject use a standard format. As an example, ASTM E 1338 has prepared a standard for alloys. Their classification describes the composition and properties needed to uniquely define an alloy. Nothing of the kind exists for concrete materials. American Concrete Institute (ACI) Committee 126, "Database Formats for Concrete Materials Properties", is creating guides for formatting data on concretes and related materials for use in preparing concrete material property databases. The guides will provide formats which simplify data transfer from one user to another.

This preliminary report, intended to serve as a working document for ACI Committee 126, presents a version of a guide to formatting data for chemical admixtures for concrete. Figure 1 shows the steps needed to develop a database. The first step in forming a database is to identify the parameters that are essential for characterizing the material and its properties.

This report has been prepared as a committee document to promote discussion and invite suggestions for improvement before the series guidelines (Figure 2) is finalized by ACI. The format described is consistent with the principles laid down by ASTM Committee E 49 as outlined in ASTM E 1309 and ASTM E 1338.

1.2 Objective

The objectives of this guide are to provide a structured format for use in presenting chemical admixtures data in a concrete materials database and to complement the efforts of ACI 126 in preparing database formats for other concrete constituents including cement, aggregates, and mineral admixtures. The formats presented in this guide are intended to simplify exchange of similarly complete sets of data among different databases.

Parameters needed to characterize chemical admixtures are represented in this guide as data elements or fields. Each data element represents information that is required to uniquely identify a chemical admixture, to describe its properties, and to report its usage in concrete. Although, the data elements identify important chemical admixtures characteristics that should be included in a comprehensive material property database, they are not intended to be an all inclusive list of data that could be stored, nor are they intended to specify the way in which the data are to be displayed or presented.

2. TERMINOLOGY

2.1 Terms specific to concrete

Concrete is defined in ACI 116R as a composite material that consists essentially of a binding medium within which are embedded particles or fragments of aggregate. Other concrete related terms used in this guide are defined in reference documents listed in Chapter 5.

Admixtures are "materials other than water, aggregates, hydraulic cement and fiber reinforcement used as an ingredient of concrete or mortar and added to the batch immediately before or during its mixing" [ASTM C 125].

2.2 Terms used in this guide

Terms used to describe the components of a concrete materials property database are presented in this section. The relationships among the components are shown in Figure 3. A database consists of data files that are, internally, composed of data segments and data elements.

2.2.1 *Concrete materials property database*: a collection of data files in which properties of concretes are organized and stored.

2.2.2 *Data file*: a complete concrete material property database entry or record that contains properties, data, and information for one particular concrete.

2.2.3 *Data segment*: a category of information that is used to subdivide and designate sets of related data elements.

Note: Certain data segments may be used a number of times to report constituent information and properties of a particular concrete.

2.2.4 *Data element*: an individual piece of information used in describing a material or in recording test results; for example, a variable name or test parameter.

Note: Each data element in this guide is represented by a data element number, data element name, data element type, and data element format. Certain data elements, which are included in this guide because they are essential for unique material identification of chemical admixtures, are also functional parts of other ACI 126 guides.

Entries for these particular data elements may be scattered throughout the data file.

2.2.5 *Data element number*: a four-or six-digit number used to denote an individual data element. These numbers represent the entire set of information in a particular data element. Data element numbers are considered a functional part of the guide and may be used for data element reference.

Note: These number represents the entire set of information in a particular data element. The first digit in the data number provides cross reference to other ACI 126 guides. Data element with numbers that include an "X" designate data elements from other databases developed in accord with other ACI 126 guides. For example, 5XXX.XX denotes a data element from the Properties and Performance Guide, while 6XXX.Xx denotes a data element from the Processing Guide, and X00X.XX denotes a data element from one of the cement, aggregate, chemical admixture, mineral admixture, or other constituent guides. The two digits following the decimal point in the last two examples can be used to distinguish between entries in a set having the same four-digit data element number. The ranges of data element numbers assigned are represented in Table 1.

2.2.6 Data element name: a descriptive term or title that designates the type of information or data to be reported in the data element

2.2.7 Data element type: a designation of “essential” or “desirable” that reflects the significance of the data element entry.

Note: Fields are designated “essential” if they are necessary to make a meaningful comparison of property data from different sources. (A comparison of data from different sources may still be possible if essential information is omitted, but the value of the comparison may be greatly reduced).

2.2.8 Data element format: the representation of the data used to report information or data as it appears in the computer.

Note: Alphanumeric, floating point, and special entry formats may be specified in this guide for use in reporting information, unit designations, numerical values, and text. Details of the YYYYMMDD (year:month:date) format are presented in Subsection 4.5.2

3. DATA SEGMENTS

3.1 Introduction

Four data segments represent categories of information that are necessary for identification of a chemical admixture and for recording its properties and performance in concrete. They are:

- Constituent identification
- Chemical and Physical characteristics
- Manufacturer’s recommendations
- Admixtures performance in concrete

Each data segment is identified and defined in Section 3.2. Table 2 lists of all the data segments and identifies the data elements associated with each data segment.

3.2 Data Segment Definitions

3.2.1 Constituent Identification: 10 data elements used to identify a specific chemical admixture in the database (section 4.2).

3.2.2 Chemical and physical characteristics: 12 data elements used to identify each chemical in the chemical admixture (section 4.3).

3.2.3 Manufacturer's recommendations: 26 data elements (section 4.4) used to report information provided by the manufacturer of the chemical admixture including recommendations for its use in concrete.

3.2.4 Admixture performance in concrete: 24 data elements (section 4.5) used to report the results of tests performed to determine the effects of chemical admixtures on the performance of concrete.

Note: Types of results that could be reported include, but are not limited to, rheological properties, setting time, air content, compressive strength, flexural strength, length change and frost resistance. These results may be obtained from tests performed using concrete, cement paste, or mortar.

4. DATA ELEMENTS

4.1 Introduction

Each data segment is subdivided into sets of data elements that are used to report either essential or desirable information. Data elements for each data segment are defined in the following sections. The use of SI units is preferred and the reporting of all properties in SI units is always required.

4.2 Chemical Admixture Designation

4.2.1 *Constituent class* (essential): distinguishes one broad class of concrete constituents from another.

Note: Materials within each class typically have similar compositions or chemical formulations, or other similar characteristics or features. Cements, aggregates, chemical admixtures and mineral admixtures are examples of classes of constituents. This entry should conform to requirements contained in the guide to the appropriate class for cements, aggregates, chemical admixtures, mineral admixtures, or other solid or liquid constituents. In this guide, the class is chemical admixtures.

4.2.2 *Constituent common name* (essential): the common name for the class of constituents reported in the previous data element: air-entraining admixture, water-reducing admixture, and water are examples of common names for constituents.

4.2.3 *Constituent producer name* (essential): the name of the company that produced the constituent.

4.2.4 *Constituent producer plant location* (essential): the address where the constituent was produced or the location from which the constituent was obtained.

4.2.5 *Constituent producer's identification number* (essential): an alphanumeric number assigned by the producer to distinguish one lot or batch of constituent from another.

4.2.6 *Constituent standards organization* (essential): the company, industry, national, or international organization that produced the specification, if any, with which the constituent complies; ASTM and ISO are examples of organizations that issue standard specifications for materials.

4.2.7 *Constituent specification number* (essential): the specification number for the standards organization reported above; numbers such as A 820, C 150, C 260, C 494, and C 618 are examples of ASTM standard specification numbers for concrete constituents.

4.2.8 *Constituent specification version* (essential): the version of the standard specification reported in the preceding element.

Note: A version is usually a number that represents the date of issue.

4.2.9 *Constituent specification designation* (essential): the designation, if any, of the product within the standard specification reported above. Type I, Type A, and Class F are examples of ASTM standard specification designations.

4.2.10 *Constituent notes* (desirable): notes and comments about the constituent.

4.3 Chemical and Physical Characteristics

4.3.1 *Chemical constituent* (essential): the name of a chemical used in the manufacture of the admixture.

4.3.2 *Percent by mass* (essential): the amount (percent by mass) of the chemical used to manufacture the admixture.

4.3.3 *Total active agent* (essential): the mass of the active agent per unit of mass of the admixture.

4.3.4 *Total active agent units (customary units)* (desirable): if customary units were used to report the total active agent, specify the units.

4.3.5 *Total active agent (SI units)*: (essential): the SI units used to report the total active agent.

4.3.6 *Customary to SI conversion factor* (desirable): the conversion factor used to convert the customary units (if any) for the total active agent to SI units, reported as a floating point decimal.

4.3.7 *pH* (desirable): the pH of the admixture.

4.3.8 *Density* (desirable): the density of the admixture.

4.3.9 *Density units (customary units)*: (desirable): if customary units were used to report the density, specify the units.

4.3.10 *Density units (SI units)* (essential): the SI units used to report the density.

4.3.11 *Customary to SI units conversion factor* (desirable): the conversion factor used to convert the customary units (if any) for the density to SI units, reported as a floating point decimal.

4.3.12 *Comments* (desirable): any other description or notes about the tests.

4.4 Manufacturer's Recommendations

4.4.1 *Safety information* (essential): any known hazard linked to the use of the chemical admixture; reference to its MSDS (Material Safety Data Sheet) may be sufficient.

4.4.2 *Dosage, minimum* (essential): the manufacturer's recommended dosage in concrete.

4.4.3 *Dosage, maximum* (essential): the manufacturer's recommended dosage in concrete.

4.4.4 *Dosage units (customary units)* (desirable): if customary units were used to report the dosage, specify the units.

4.4.5 *Dosage units (SI units)* (essential): the SI units used to report the dosage.

4.4.6 *Customary to SI units conversion factor* (desirable): the conversion factor used to convert the customary units (if any) for the dosage to SI units, reported as a floating point decimal.

4.4.7 *Time of addition* (essential): the recommended time after the first contact of the water and the cement that the admixture is to be added to the concrete.

4.4.8 *Time of addition units* (essential): the units used to report the time of addition.

- 4.4.9 *Method of addition* (essential): how the admixture should be added to the concrete, e.g. using a metering pump or pouring the whole amount immediately into the mixer.
- 4.4.10 *Recommended use* (essential): advice to the user on how to obtain the best results.
- 4.4.11 *Temperature limits for use, high* (essential): the highest environmental temperature at which the admixture can be used.
- 4.4.12 *Temperature limit for use, low* (essential): the lowest environmental temperature at which the admixture can be used.
- 4.4.13 *Temperature limit for use units (customary units)* (desirable): if customary units were used to report the temperatures, specify the units.
- 4.4.15 *Temperature units (SI units)* (essential): the SI units used to report the temperatures.
- 4.4.16 *Customary to SI units conversion equation* (desirable): the conversion equation used to convert the customary units (if any) for the temperatures to SI units.
- 4.4.17 *Shelf life* (desirable): how long an admixture can be stored without losing its effectiveness.
- 4.4.18 *Shelf life, units* (desirable): the units of time used to report the shelf life.
- 4.4.19 *Storage temperature limit, high* (desirable): the highest temperature acceptable for storage of the admixture.
- 4.4.20 *Storage temperature limit, low* (desirable): the lowest temperature acceptable for storage of the admixture.
- 4.4.21 *Storage temperature limit, freezing point* (desirable): the freezing point of the admixture.
- 4.4.22 *Storage temperature limit, boiling point* (desirable): the boiling point of the admixture.
- 4.4.23 *Storage temperature limit, units (customary units)* (desirable): if customary units were used to report the storage temperature limits, specify the units.
- 4.4.24 *Storage temperature limits units (SI units)* (desirable): the SI units used to report the exposure limits.
- 4.4.25 *Customary to SI units conversion equation* (desirable): the conversion equation used to convert the customary units (if any) for the temperatures to SI units.
- 4.4.26 *Brief description of mechanisms* (desirable): brief description of the mechanisms by which the admixture modifies the concrete.
- 4.4.27 *Compatibility with other admixtures* (essential): warning about potential deleterious effects of using the admixture in combination with other admixtures or chemicals.
- 4.4.28 *Comments* (desirable): any other description or notes about the tests

4.5 Chemical Admixture Performance in Concrete

4.5.1 Concrete mixture proportions

4.5.1.1 *Constituent quantity per unit volume of concrete* (essential): the quantity (mass or volume): of a constituent material used to prepare a unit volume of concrete, reported as a floating point decimal.

4.5.1.2 *Constituent quantity per unit volume units (customary units)* (desirable): if customary units were used to report the quantity per unit of volume, specify the units.

4.5.1.3 *Constituent quantity per unit volume units (SI units)* (desirable): the SI units used to report the quantity per unit volume of concrete.

4.5.1.4 *Customary to SI units conversion factor* (desirable): reports the conversion factor used to convert the customary units (if any) for the quantity per unit volume of concrete to SI units, reported as a floating point decimal.

4.5.2 Material processing

4.5.2.1 *Processing date* (essential): the date the concrete (or other cement-based material) was processed using the YYYYMMDD HH:MM (year:month:date hour:minutes (24 hour clock)) format.

Note: The first four digits of this format represent the year, the next two digits represent the month, and the last two digits represent the day. For example 19940308 14:30 represents March 8, 1994 at 2:30 p.m.

4.5.2.2 *Batching process* (desirable): the batching process used for measuring the constituents for a batch of the product.

Note: Manual mass batching, semiautomatic mass batching, automatic mass batching, cumulative automatic mass batching, individual automatic mass batching, and volumetric batching are examples of concrete processes.

4.5.2.3 *Mixing equipment* (desirable): the type of mixer used for mixing the constituents, e.g., colloid mixer, horizontal shaft mixer, non tilting mixer, open top mixer, pan mixer, paddle mixer, continuous mixer, tilting mixer, transit mixer, and vertical shaft mixer are examples of types of mixers used to prepare batches of products.

4.5.2.4 *Transporting and placing equipment* (desirable): the type of equipment used for transporting the product from the mixer to the point of discharge and the type of equipment used for placing the product, whether in the field or laboratory.

Note: Wheelbarrow, buggy, chute, dump bucket, truck with agitator, truck without agitator, conveyor belt, portable conveyor, feeder or series conveyor, spreading conveyor, radial spreader, straight line spreader, piston pump, pneumatic pump, and squeeze pressure pump are examples of transporting equipment. Scoops, shovels, buckets, hoppers, chutes, tremie, paving equipment, and slipforming equipment are examples of placing equipment.

4.5.2.5 *Consolidating equipment* (desirable): the type of equipment used to consolidate the product, e.g., spades, hand tampers, rods, power tampers or rammers, internal vibrators, external vibrators, surface vibrators, table vibrators, and various other devices are examples of consolidating equipment.

4.5.2.6 *Surface finish* (desirable): the final surface finish of the product, e.g., exposed aggregate, trowelled, broomed, rubbed, floated, screeded, polished, grooved, and formed are examples of surface finishes.

4.5.2.7 *Curing technique* (desirable): the curing procedure or technique.

Note: Curing with water and curing by moisture retention are techniques that are often used. Wet burlap, damp sand, sprinkling, soaking, and ponding are examples of curing materials or procedures used in the wet curing technique. Polyethylene film, plastic membranes, waterproof paper, and curing compounds are examples of curing materials used in the moisture retention curing technique.

4.5.2.8 *Material processing notes* (desirable): reports processing-related notes and comments.

4.5.3 Performance in the product

4.5.3.1 *Property designation* (essential): the name of the property.

4.5.3.2 *Property method description* (essential): description of the type of instrument or test used to measure the property.

Note: If a standard method is used it should be indicated (with mention of the version used).

4.5.3.3 *Age of the sample at test* (essential): the time elapsed between mixing and testing of the sample.

4.5.3.4 *Age units* (essential): the units used in reporting the age of the sample at test.

4.5.3.5 *Test result* (essential): the test results.

4.5.3.6 *Test result, units (customary units)* (desirable): the customary units, if used to report test results

4.5.3.7 *Test result units (SI units)* (desirable): the SI units used to report the test results.

4.5.3.8 *Customary to SI units conversion factor* (desirable): the conversion factor used to convert the customary units (if any) for the test result to SI units, reported as a floating point decimal.

4.5.3.9 *Other parameter, name* (desirable): any other parameter that can help describe the test method or result.

4.5.3.10 *Other parameter, value* (essential): the value of the other parameter.

4.5.3.11 *Other parameter, units (customary units)* (desirable): the customary units, if used to report the other parameter.

4.5.3.12 *Other parameter, units (SI units)* (desirable): the SI units used to report the value of the other parameter.

4.5.3.13 *Customary to SI units conversion factor* (desirable): the conversion factor used to convert the customary units (if any) for the value of the other parameter to SI units, reported as a floating point decimal.

4.5.3.14 *Comments* (desirable): any other description or notes about the tests.

5. REFERENCE DOCUMENTS CITED IN THIS GUIDE

5.1 American Concrete Institute documents

- 116 Cement and Concrete Terminology
- 126 Guide to a Recommended Format for the Identification of Concrete in a Materials Property Database (to be published)

5.2 American Society for Testing and Materials documents

- C 125 Standard Terminology Relating to Concrete and Concrete Aggregates
- C 150 Standard Specification for Portland Cement
- C 494 Specification for Chemical Admixtures for Concrete
- E 1309 Standard Guide for the Identification of Composite Materials in Computerized Material Property Databases
- E 1338 Standard Guide for the Identification of Metals and Alloys in Computerized Material Property Databases
- E 1443 Standard Terminology Relating to Building and Accessing Material and Chemical Databases
- E 1484 Standard Guide for Formatting and Use of Material and Chemical Property Data and Database Quality Indicators

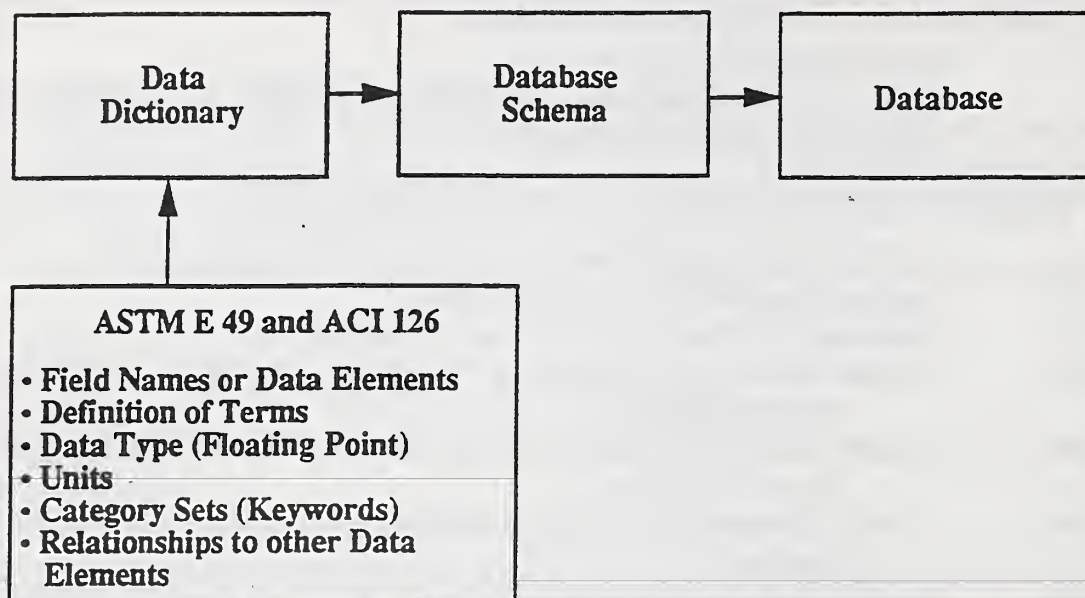
6. Acknowledgments

I would like to thank Barry Oland (Oak Ridge National Laboratory) and Geoffrey Frohnsdorff (NIST) . Without their valuable input this report could not have being possible. Initial support for this work was also obtained by W.R. Grace during the author's employment with them. The completion of this work was supported by NIST.

Database Development Process

as described by John Rumble

December 4, 1992



DATA DICTIONARY

A data dictionary is essentially a guide for understanding the information in a database and has features similar to those found in a language dictionary. In the data dictionary, one can find a description, the origin, and the usage of each specific piece of data presented in the database. It also provides additional information describing the relationship of a given piece of data to all other pieces of data including the format that best fits the data, such as numeric, alphanumeric, date, or customized. The data dictionary is a framework on which the database is built.

DATABASE SCHEMA

A schema is a perspective, a way of seeing the information in a database. Three widely accepted schemas are called conceptual, physical, and external or subschema. The conceptual schema is the complete, logical view of the entire database including the data dictionary along with the data existence requirements and constraints. The physical schema is basically the viewpoint of the computer's operating system and includes descriptions of database file characteristics. The external or subschema is the user's and often a program's view of the database.

DATABASE

A database is a term used to describe a computerized collection of related information.

(Source: "Manual on the Building of Materials Databases," Crystal H. Newton, editor, ASTM Manual Series: MNL 19, November 1993)

Figure 1. Database Development Process

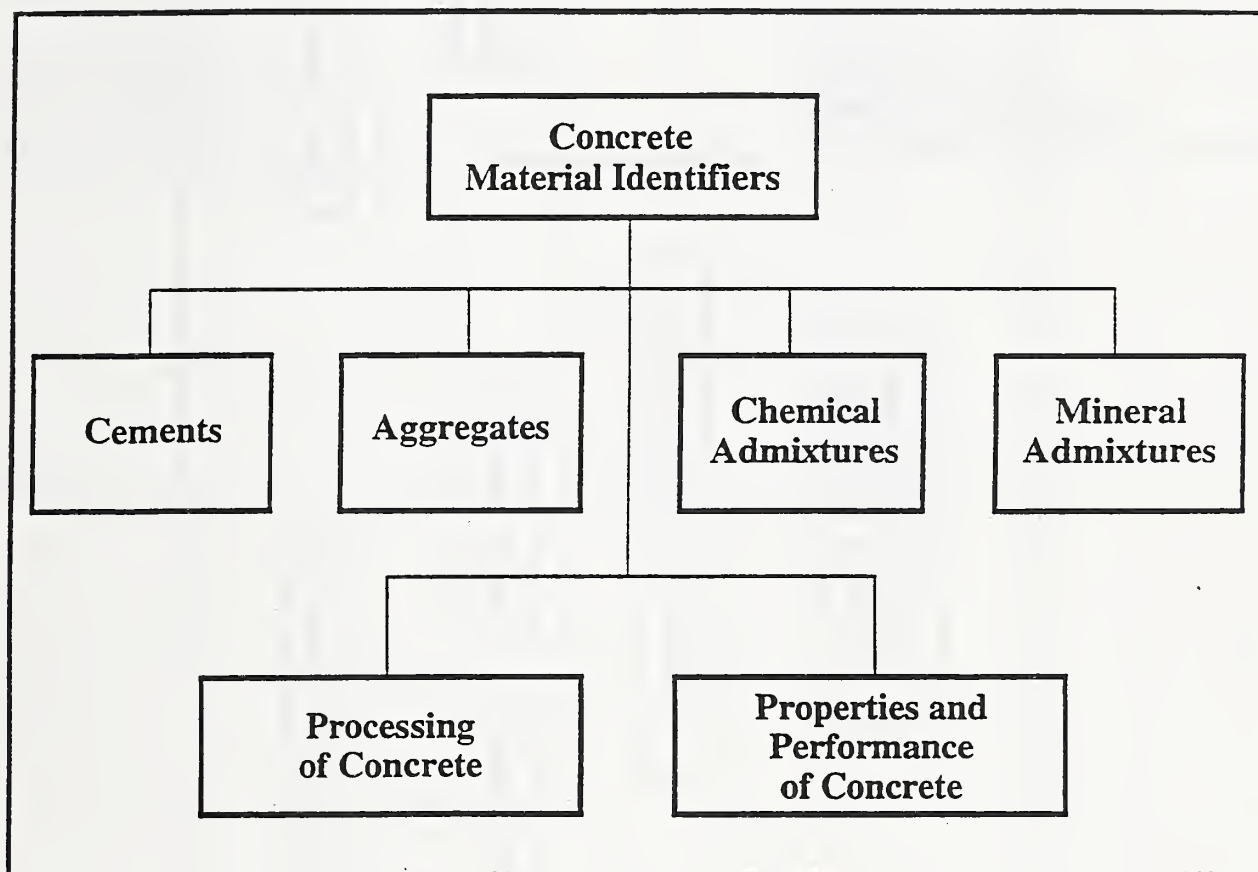


Figure 2: Relationships among the Guides to recommended formats for concrete materials property data

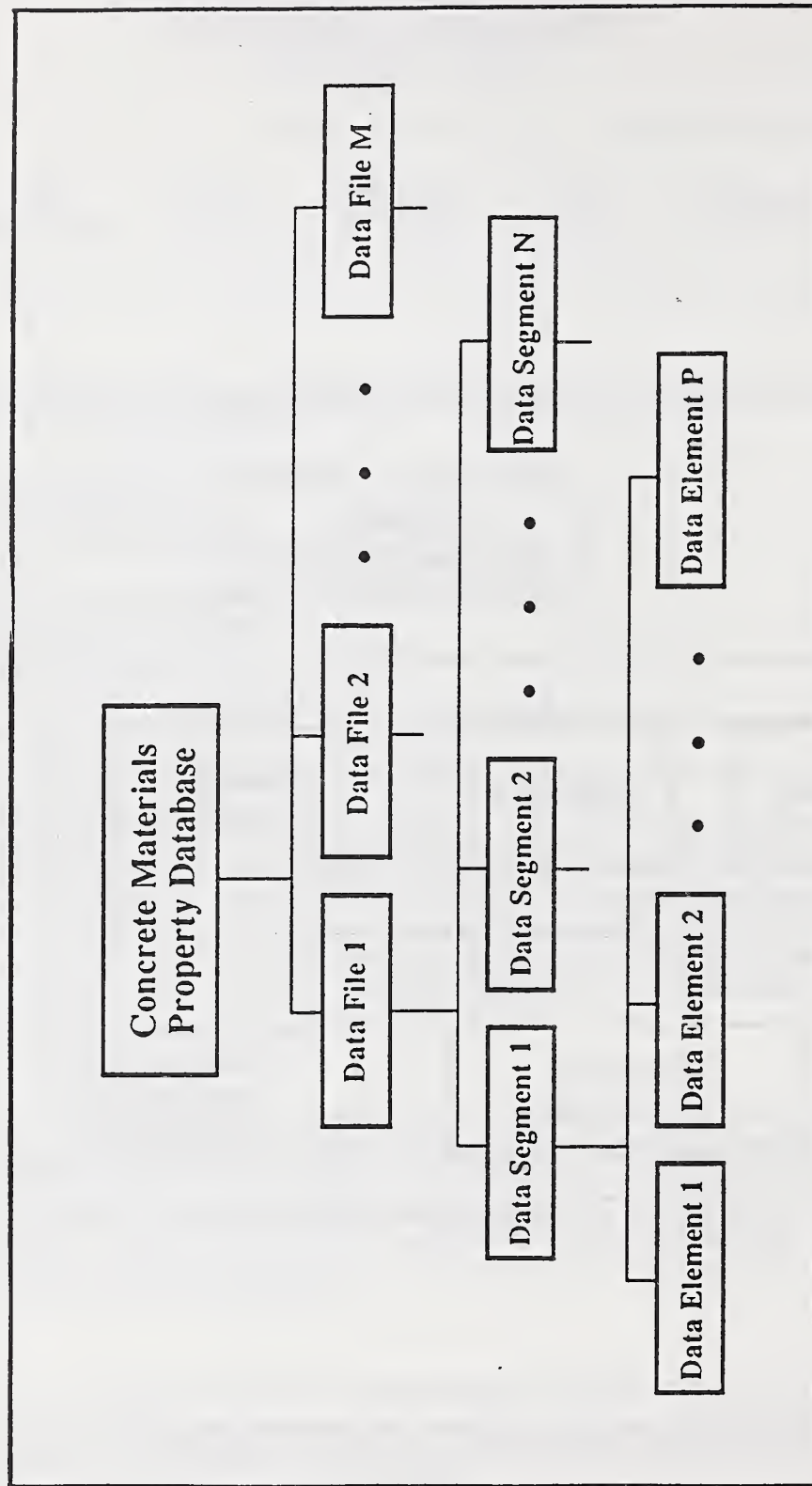


Figure 3: Relationships among components of a concrete materials property database

Table 1: Data element number range designations

Data Element Number Range	ACI Committee 126 Task Group	Guide Subject
1000 - 1999	1	Cement
2000 - 2999	2	Aggregates
3000 - 3999	3	Chemical Admixtures
4000 - 4999	4	Mineral Admixtures
5000 - 5999	5	Properties and Performance
6000 - 6999	6	Processing
7000 - 7999	7	Material Identifiers
8000 - 8999	8	Other Solid Constituents
9000 - 9999	9	Other Liquid Constituents

**TABLE 2: DATA ELEMENTS FOR THE DEFINITION
OF CHEMICAL ADMIXTURES FOR CONCRETE**

Constituent Designation Data Segment (see section 4.2)

Number^a	Name	Type^b	Format
3001.xx	Constituent Class	Essential	Alphanumeric String
3002.xx	Constituent Common name	Essential	Alphanumeric String
3003.xx	Constituent Producer Name	Essential	Alphanumeric String
3004.xx	Constituent Producer Plant Location	Essential	Alphanumeric String
3005.xx	Constituent Producer's Identification Number	Essential	Alphanumeric String
3006.xx	Constituent Standards Organization	Desirable	Alphanumeric String
3007.xx	Constituent Specification Number	Desirable	Alphanumeric String
3008.xx	Constituent Specification Version	Desirable	Alphanumeric String
3009.xx	Constituent Specification Designation	Desirable	Alphanumeric String
3010.xx	Constituent Notes	Desirable	Alphanumeric String

a) Data Element numbers are a functional part of the guide

b) All data elements are considered desirable. Reporting of essential data elements is strongly recommended

TABLE 2: cont'd DATA ELEMENTS			
Chemical and Physical Characteristics Data Segment ^c (see section 4.3)			
3011.xx	Chemical Name	Essential	Alphanumeric String
3012.xx	Percent by Mass	Essential	Floating Point
3013	Total Solid	Essential	Floating Point
3014	Total Solid Units (customary units)	Desirable	Alphanumeric String
3015	Total Solid Units (SI units)	Essential	Alphanumeric String
3016	Customary to SI conversion factor	Desirable	Floating Point
3017	pH	Desirable	Floating Point
3018	Density	Desirable	Floating Point
3019	Density (Customary Units)	Desirable	Alphanumeric String
3020	Density (SI units)	Essential	Alphanumeric String
3021	Customary to SI Units Conversion Factor	Desirable	Floating Point
3022	Comments	Desirable	Alphanumeric String
c) repeat the data elements for this data segment as many time as necessary.			

TABLE 2: cont'd DATA ELEMENTS

Manufacturer's Recommendations Data Segment (see section 4.4)			
Number ^a	Name	Type ^b	Format
3022	Safety Information	Essential	Alphanumeric String
3023	Dosage Minimum	Essential	Floating Point
3024	Dosage Maximum	Essential	Floating Point
3025	Dosage units (Customary Units)	Desirable	Alphanumeric String
3026	Dosage units (SI Units)	Essential	Alphanumeric String
3027	Customary to SI Units Conversion Factor	Desirable	Floating Point
3028	Time of Addition	Essential	Floating Point
3029	Time of Addition (Units)	Essential	Alphanumeric String
3030	Method of Addition	Essential	Alphanumeric String
3031	Recommended Use	Essential	Alphanumeric String
3032	Temperature Limit of Use (High)	Essential	Floating Point
3033	Temperature Limit of Use (Low)	Essential	Floating Point
3034	Temperature Limit of Use (Customary Units)	Essential	Alphanumeric String
3035	Temperature Limit of Use (SI units)	Essential	Alphanumeric String
3036	Customary to SI Units Conversion Factor	Desirable	Floating Point
3037	Shelf Life	Desirable	Floating Point
3038	Shelf Life (Units)	Desirable	Alphanumeric String
3039	Exposure Limits (High)	Desirable	Floating Point
3040	Exposure Limits (Low)	Desirable	Floating Point
3041	Exposure Limits (Freezing Point)	Desirable	Floating Point
3042	Exposure Limits (Boiling Point)	Desirable	Floating Point
3043	Exposure Limits units (customary units)	Desirable	Alphanumeric String
3044	Exposure Limits units (SI Units)	Desirable	Alphanumeric String
3045	Customary to SI Units Conversion Factor	Desirable	Floating Point
3046	Brief Description of Mechanisms	Desirable	Alphanumeric String
3047	Compatibility with Other Admixtures	Desirable	Alphanumeric String
3048	Comments	Desirable	Alphanumeric String

TABLE 2: cont'd DATA ELEMENTS			
Chemical Admixture Performance in Concrete (see section 4.5)			
Constituent designation and mixture proportions ^c (see section 4.5.1)			
Number ^a	Name	Type ^b	Format
X001.xx	Constituent Class	Essential	Alphanumeric String
X002.xx	Constituent Common Name	Essential	Alphanumeric String
X003.xx	Constituent Producer Name	Essential	Alphanumeric String
X004.xx	Constituent Producer Plant Location	Essential	Alphanumeric String
X005.xx	Constituent Producer's Identification Number	Essential	Alphanumeric String
X006.xx	Constituent Specification Organization	Desirable	Alphanumeric String
X007.xx	Constituent Specification Number	Desirable	Alphanumeric String
X008.xx	Constituent Specification Version	Desirable	Alphanumeric String
X009.xx	Constituent Specification Designation	Desirable	Alphanumeric String
X010.xx	Constituent Notes	Desirable	Alphanumeric String
6XXX.Xx	Constituent Quantity per Unit Volume of Mixture	Essential	Alphanumeric String
6XXX.Xx	Constituent Quantity per Unit Volume (Customary Units)	Essential	Alphanumeric String
6XXX.Xx	Constituent Quantity per Unit Volume (SI Units)	Desirable	Alphanumeric String
6XXX.Xx	Customary to SI Units Conversion Factor	Desirable	Floating Point
Material Processing (see section 4.5.2)			
6XXX	Processing Date	Desirable	YYMMDD
6XXX	Batching Process	Desirable	Alphanumeric String
6XXX	Mixing Equipment	Desirable	Alphanumeric String
6XXX	Transporting and Placing Equipment	Desirable	Alphanumeric String
6XXX	Consolidation Equipment	Desirable	Alphanumeric String
6XXX	Surface Finish	Desirable	Alphanumeric String
6XXX	Curing Technique	Desirable	Alphanumeric String
6XXX	Processing Notes	Desirable	Alphanumeric String
a) see Table 1 for data element numbers and corresponding constituents b) All data elements are considered desirable. Essential data elements are important for unique identification. c) Repeat the data elements in this data segment for each constituent in the concrete mixture			

TABLE 2: cont'd DATA ELEMENTS			
“Chemical Admixture Performance in Concrete” cont'd (see section 4.5)			
Chemical Admixture Performance in the Product (see section 4.5.3)^b			
3070.xx	Property Designation	Essential	Alphanumeric String
3071.xx	Property Method Description	Essential	Alphanumeric String
3072.xx	Mixing Time	Desirable	Floating Point
3073.xx	Age of the Sample at Test	Essential	Floating Point
3074.xx	Age Units	Essential	Alphanumeric String
3075.xx	Test Results	Essential	Floating Point
3076.xx	Test Results units (Customary Units)	Desirable	Alphanumeric String
3077.xx	Test Results units (SI Units)	Essential	Alphanumeric String
3078.xx	Customary to SI Conversion Factor	Desirable	Floating Point
3079.xx	Other Parameter Name	Desirable	Alphanumeric String
3080.xx	Other Parameter Value	Desirable	Floating Point
3081.xx	Other Parameter (Customary Units)	Desirable	Alphanumeric String
3082.xx	Other Parameter (SI Units)	Desirable	Alphanumeric String
3083.xx	Customary to SI Conversion Factor	Desirable	Floating Point
3084.xx	Comments	Desirable	Alphanumeric String
a) All data elements are considered desirable. Reporting of essential data elements is strongly recommended.			
b) Repeat the data element for this data segment as many times as necessary			

7. APPENDIX A: EXAMPLE USE OF THE GUIDE

**TABLE A A NEW WATER REDUCER
AS CONCRETE CHEMICAL ADMIXTURE**

Chemical Admixture Designation		
Number	Name	Example Entry
3001.01	Constituent Class	chemical admixture
3002.01	Constituent Common name	Water reducer
3003.01	Constituent Producer Name	Perlinpin
3004.01	Constituent Producer Plant Location	Columbia, USA
3005.01	Constituent Producer's Identification Number	6263
3006.01	Constituent Specification Organization	ASTM
3007.01	Constituent Specification Number	C 494
3008.01	Constituent Specification Version	90
3009.01	Constituent Specification Designation	Type A
3010.01	Constituent Notes	Color red

Chemical and Physical Characteristics

3011.01	Chemical Composition	Water
3012.01	Percent by Mass	60
3011.02	Chemical Composition	Sodium Sulfate
3012.02	Percent by Mass	40
3013	Total Solid	40
3014	Total Solid Units (SI units)	%
3016	pH	10
3017	Density	1200
3019	Density Units	kg/m ³

TABLE A: cont'd Example		
Manufacturer's Recommendations		
Number	Name	Example Entry
3022	Safety Information	MSDS 122
3023	Dosage Minimum	0.4 % solid/ cement by mass
3024	Dosage maximum	
3026	Dosage (Units)	
3028	Time of Addition	10
3029	Time of Addition (Units)	min.
3030	Method of Addition	by itself
3031	Recommended Use	to reduce water by 10%
3032	Temperature Limit for Use (High)	10
3033	Temperature Limit for Use (Low)	40
3035	Temperature Limit for Use (Units)	Degree Celsius
3037	Shelf Life	10
3038	Shelf Life (Units)	years
3039	Exposure Limits (High)	60
3040	Exposure Limits (Low)	5
3041	Exposure Limits (Freezing Point)	5
3042	Exposure Limits (Boiling Point)	110
3044	Exposure Limits (Units)	Degree Celsius
3046	Brief Description of Mechanisms	Proprietary
3047	Compatibility with Other Admixtures	Do not use with chemical admixtures manufactured by other producers

TABLE A: cont'd Example		
Chemical Admixture Performance in concrete		
Constituent Designation and Mixture Proportions		
Number	Name	Example Entry
1001.01	Constituent Class	Cement
1002.01	Constituent Common Name	Type I Portland Cement
1003.01	Constituent Producer Name	Toto
1004.01	Constituent Producer Plant Location	Columbia
1005.01	Constituent Producer's Identification Number	1991
1006.01	Constituent Specification Organization	ASTM
1007.01	Constituent Specification Number	C150
1008.01	Constituent Specification Version	86
1009.01	Constituent Specification Designation	Type I
1010.01	Constituent Notes	1 drum is available
6XXX.11	Constituent Quantity per Unit Volume of Mixture	2062
6XXX.11	Constituent Quantity per Unit Volume (Customary Units Designation)	lb./cyd
6XXX.11	Constituent Quantity per Units Volume (SI Units Designation)	kg/m ³
6XXX.11	Customary to SI Units Conversion Factor	0.5932

TABLE A: cont'd Example		
“Chemical Admixture Performance in concrete” cont'd		
Constituent Designation and Mixture Proportions cont'd		
Number	Name	Example Entry
9001.01	Constituent Class	Other Liquid Constituents
9002.01	Constituent Common Name	Water
9003.01	Constituent Producer Name	Howard County
9004.01	Constituent Producer Plant Location	Columbia, USA
9005.01	Constituent Producer's Identification Number	1992
9006.01	Constituent Specification Organization	
9007.01	Constituent Specification Number	
9008.01	Constituent Specification Version	
9009.01	Constituent Specification Designation	
9010.01	Constituent Notes	None
6XXX.91	Constituent Quantity per Unit Volume of Mixture	1031
6XXX.91	Constituent Quantity per Unit Volume (Customary Units Designation)	lb./cyd
6XXX.91	Constituent Quantity per Unit Volume (SI Units Designation)	kg/m ³
6XXX.91	Customary to SI Units Conversion Factor	0.5932

TABLE A: cont'd Example		
“Chemical Admixture Performance in concrete” cont'd		
Constituent Designation and Mixture Proportions cont'd		
Number	Name	Example Entry
3001.01	Constituent Class	Chemical Admixture
3002.01	Constituent Common Name	Superplasticizer
3003.01	Constituent Producer Name	Slide
3004.01	Constituent Producer Plant Location	Columbia
3005.01	Constituent Producer's Identification Number	6666
3006.01	Constituent Specification Organization	ASTM
3007.01	Constituent Specification Number	494
3008.01	Constituent Specification Version	86
3009.01	Constituent Specification Designation	Type A
3010.01	Constituent Notes	Price \$10/lb.
6XXX.31	Constituent Quantity per Unit Volume of Mixture	0.01
6XXX.31	Constituent Quantity per Unit Volume (Customary Units)	lb./cyd
6XXX.31	Constituent Quantity per Units Volume (SI Units)	kg/m ³
6XXX.31	Customary to SI Units Conversion Factor	0.5932
Material Processing		
Number	Name	Example Entry
6XXX	Processing Date	920309
6XXX	Batching Process	Manual mass batching
6XXX	Mixing Equipment	Hobart mixer
6XXX	Transporting and Placing Equipment	placed by hand
6XXX	Consolidation Equipment	tamper
6XXX	Surface Finish	by hand with a spatula
6XXX	Curing Technique	fog room
6XXX	Processing Notes	none

TABLE A: cont'd Example		
“Chemical Admixture Performance in concrete” cont'd		
Admixture Performance in Concrete		
3070.01	Property Considered	Flow
3071.01	Method Used	Mini slump
3072.01	Mixing Time	10:30
3073.01	Age of the Sample at Test	5
3074.01	Age (Units)	min.
3075.01	Result	92
3077.01	Results (Units)	mm
3079.01	Other Parameters	none
3084	Comments	none

8. Appendix B: ACI Committee 126 members

- Geoffrey Frohnsdorff Chairman
- C. Barry Oland Secretary
- Marwan A. Daye
- Sharon M. De Hayes
- Timothy P. Dolen *
- Chiara F. Ferraris * Chair, Chemical Admixtures Subcommittee
- Per Fidjestol
- Doug Hooton
- William F. Kepler *
- Lawrence J. Kaetzel *
- Steven H. Kosmatka
- Tony C. Liu
- Robert A. Nunez
- Charles F. Scholer
- James M. Shilstone, Jr
- Kurt F. von Fay

* Associate Member

